

REMARKS

Election/Restrictions

Applicant affirms the election, without traverse, of claims 1-9 and 12-26. The non-elected claims have here been canceled without prejudice.

Priority

As requested by the Examiner, the specification has been amended to contain a specific reference to the Japanese priority application in the first sentence of the application.

Claim Rejections

Independent Claims 1 to 4 and their dependent claims 5-8, 12-15, 17-20, and 22-25 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admitted prior art from the specification, in view of U.S. Pat. No. 6,077,451 to Takenaka et al. (hereinafter referred to as "Takenaka") and further in view of Japanese Patent No. 7,183,240 to Honma et al. (hereinafter referred to as "Honma").

Independent claim 1 has been amended to recite a method for producing a quartz glass jig that includes processing a quartz glass raw material into a desired shape by a treatment including fire working, annealing the quartz glass jig so as to remove stress, and cleaning treatment to obtain a final product. A gas phase etching step and a gas phase purification step are performed on a surface layer of the quartz glass jig after annealing the quartz glass jig, but before the cleaning treatment. The gas phase purification step is carried out continuously after the gas phase etching step

This method produces a quartz glass jig with a cleaner surface layer, and can be performed at low cost and with little extra labor. See specification, page 3, lines 10-20. In

contrast, prior art methods for producing quartz glass jigs encounter the problem of contamination of the jigs due to diffusion of metal impurities from the surface layer of the quartz glass into the depth of the jig during the high-temperature thermal treatments of the manufacturing process. See specification, page 1, lines 18-25, and page 3, lines 1-14. Because they permeate deeply into the jig, these metal impurities cannot be removed by washing or cleaning the jig, and they are later re-released into silicon wafers when the quartz glass jigs are used in the manufacturing of semiconductors, resulting in the production of a defective wafer product.

The method of independent claim 1 as amended is not suggested by the state of the art as described by applicant in the specification or by the other cited art, and reconsideration of the rejection is respectfully requested.

The prior art methods described by applicant for producing a quartz glass jig with a surface layer that is almost free from metallic impurity were

1. cleaning the atmosphere in the chamber used to manufacture the quartz glass jig,
2. use of a flame burner of quartz glass, or
3. annealing in a furnace with a wall of a special clean material.

None of these prior-art approaches has been found sufficient, and none involve or suggest a gas phase etching step and a gas phase purification step after the annealing and before the cleaning treatment.

Takenaka teaches a method for processing a sample of silicon material to measure the impurities in it, not for making a quartz glass jig. In Takenaka, silicon material is etched by an

etching gas so that metal impurities in the silicon material become a solid residue. Takenaka, col. 5, lines 5 to 7. The solid residue of metal impurities is then dissolved in an acid, and analyzed with the metal impurities still dissolved in solvent. See Takenaka, col. 5, lines, 3-26.

Takenaka teaches a method for measuring impurities in a silicon material. See Takenaka, abstract lines 1 to 3. Once the residue of impurities is washed off with an acid solution, Takenaka is silent as to, and appears to have no interest in, the resulting condition of the sample. Takenaka apparently does not mention a gas phase purification of the etched sample, and does not suggest an application of its etching step to a process for manufacturing a quartz glass jig, where the condition of the jig after etching is the main concern.

Therefore, Takenaka gives no suggestion or motivation to one of ordinary skill in the art to modify any prior art methods of making a quartz glass jig to include performing a gas phase etching step or a gas purification step as recited in claim 1.

Honma teaches a method for manufacturing a quartz glass fixture in which the metal impurities are removed from the surface of the various quartz glass components making up the fixture using gas purification before the fixture is assembled. Honma, Paragraph 0006. These purified parts are then assembled into the completed fixture. Honma teaches assembly of the quartz glass parts *after* gas purification and nowhere suggests gas purification of the surface of an already assembled jig. That assembly process is likely to result in more contamination of the surface layer of the assembled quartz glass jig, and in much higher costs of manufacture.

Therefore, Honma does not suggest a method as recited in claim 1 where the quartz glass jig is annealed, and then subjected to gas etching and gas purification steps.

Hays is cited only to suggest use of hydrogen gas as a carrier-diluent, which does not

impact upon the patentability of claim 1.

Therefore, the cited prior art and applicant's admitted prior art cannot be properly combined to suggest the invention recited in claim 1, and reconsideration of the rejection thereof is respectfully requested.

Independent claim 2, 3, and 4 have been amended similarly to claim 1, and they distinguish over the prior art for similar reasons to those expressed above.

Claims 5 to 9 and 12 to 26 depend directly or indirectly from Independent claims 1, 2, 3 or 4, and therefore distinguish therewith over the prior art.

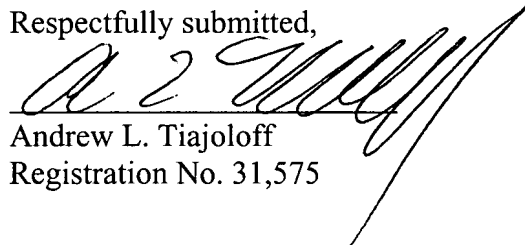
All claims having been shown to distinguish over the prior art in structure, function and result, formal allowance is respectfully requested.

Should any questions arise, the Patent Office is invited to telephone attorney for applicants at 212-490-3285.

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Respectfully submitted,


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